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Cognitive Vulnerabilities to Anxiety: A Bridge between Personality and Symptoms

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Abstract

The purpose of the study was to examine the effects of personality, anxiety sensitivity, intolerance of uncertainty and self-esteem on different anxiety symptoms. A total of 436 university students completed measures of personality, anxiety sensitivity, intolerance of uncertainty, self-esteem, and symptoms of panic, worry and social anxiety. Results have shown that neuroticism, conscientiousness and psychological concerns (anxiety sensitivity) predict symptoms of panic and that psychological concerns mediate the relationship between neuroticism and panic. Worry was predicted by neuroticism, prospective and inhibitory intolerance of uncertainty and self-liking, with intolerance of uncertainty mediating between neuroticism and worry. Finally, neuroticism, openness to experiences and extraversion, as well as social concerns (anxiety sensitivity), inhibitory intolerance of uncertainty and self-liking predicted social anxiety. Social concerns, inhibitory intolerance of uncertainty and self-liking mediated the effects of neuroticism and extraversion on social anxiety. Results offer support to neuroticism being a universal risk factor and anxiety sensitivity, intolerance of uncertainty and self-esteem having specific effects on anxiety symptoms.

Keywords: personality, anxiety sensitivity, intolerance of uncertainty, self-esteem, anxiety symptoms

Introduction

Anxiety is a normative part of life, and hardly any person does not experience mild anxiety on a daily basis. However, persistent anxiety symptoms can lead to anxiety disorders. Panic disorder, social phobia (social anxiety disorder) and generalized anxiety disorder (GAD) are some of the most common anxiety disorders. Furthermore, symptoms of panic disorder, social phobia and GAD are very common in nonclinical population. Given the fact that subclinical levels of symptoms also impair one's functioning, and can lead to anxiety disorders and other comorbid

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conditions, it is important to examine factors that make a person vulnerable to anxiety symptoms and disorders. Insight into factors associated with elevated symptoms of anxiety disorders could prove to be beneficial in creating more focused preventive efforts by targeting factors, which show the strongest effects. Models explaining the link between personality and psychopathology, while useful in explaining general vulnerability to internalizing versus externalizing symptoms, are lacking in their ability to explain the differences in vulnerabilities to specific symptoms or disorders (Hong, 2013; Hong & Paunonen, 2011). Cognitive models of anxiety, on the other hand, have identified proximal factors, which might explain the differences in pathways from personality dispositions to specific anxiety symptoms (Norton, Sexton, Walker, & Norton, 2005). Based on findings that neuroticism is a universal risk factor, we assumed that it would be associated panic symptoms, worry, and fear of negative evaluation, but that anxiety sensitivity, intolerance of uncertainty and self-esteem could offer new information about the mechanisms of those effects.

Personality

Personality factors have been linked to anxiety symptoms and disorders in numerous studies. When examining the relations of personality dimensions (most often Big five), the majority of studies have found neuroticism and extraversion to be relevant in predicting anxiety. However, neuroticism was not found to be specific of any anxiety disorder, which supports the notion that it is a basic disposition common to all anxiety disorders (Kaplan, Levinson, Rodebaugh, Menatti, & Weeks, 2015). In other words, neuroticism was found to differentiate well between people with anxiety disorders and general population but was not useful in differentiating between anxiety disorders (Watson, Gamez, & Simms, 2005). Extraversion most consistently showed strong negative correlations with social anxiety (Kotov, Gamez, Schmidt, & Watson, 2010; Watson et al., 2005; Watson & Naragon-Gainey, 2014), while the results regarding other personality dimensions are less clear. While some studies show little correlation with psychopathological symptoms (Kotov et al., 2010), other suggest that their relationship with anxiety should be more closely examined (Kaplan et al., 2015; Watson et al., 2005; Watson & Naragon-Gainey, 2014). However, given the relative lack of diagnostic specificity of personality dimensions, an argument can be made that research should focus on more narrow categories of cognitive style as possible mediators between personality and outcomes. With progress in the psychological treatment of anxiety disorders, especially in the field of cognitive behavioural therapies, research has focused on cognitive factors in explaining personal vulnerabilities to anxiety disorders. Anxiety sensitivity, intolerance of uncertainty and self-view have gained the most attention.

Anxiety Sensitivity

Anxiety sensitivity is conceptualized as fear of symptoms or sensations related to anxiety, due to the belief that those symptoms will have negative physical, psychological or social ramifications (McNally, 2002; Reiss & McNally, 1985). A person can be afraid of a sense of nervousness because he or she interprets it as a sign of loss of control, oncoming disease or potential source of embarrassment. Further research has demonstrated that anxiety sensitivity is related to, but independent of, trait anxiety. In other words, a person can have a tendency to react anxiously across many situations but not be afraid of the possible consequences of those symptoms (Naragon-Gainey, 2010; Rector, Szacun-Shimizu, & Leybman, 2007). The construct of anxiety sensitivity overlaps with diagnostic criteria for panic disorder, which emphasize the importance of fear of future panic attacks (Reiss, 1991). Indeed, patients with panic disorder exhibit more anxiety sensitivity than the general population or patients with other anxiety disorders (Deacon & Abramowitz, 2006), and anxiety sensitivity is a better predictor of panic attacks in experimental manipulation situations than trait anxiety (Eke & McNally, 1996; McNally, 2002; Rapee & Medoro, 1994). It is important to emphasize that studies, also, show that anxiety sensitivity is not merely a correlate of panic disorder, but rather a specific premorbid risk factor (Maller & Reiss, 1992; Schmidt, Lerew, & Jackson, 1997). Studies examining the relations of individual factors of anxiety sensitivity with anxiety disorders have resulted in interesting findings regarding the role of anxiety sensitivity in explaining other psychopathological symptoms. Social concerns were most strongly related to social anxiety, physical concerns with panic, while the effects of psychological concerns were less related to panic as well as symptoms of GAD (Blais et al., 2001; Deacon & Abramowitz, 2006; Naragon-Gainey, 2010; Rector et al., 2007). Therefore, anxiety sensitivity is an important factor in understanding aetiology, as well as maintenance of symptoms of anxiety disorders. However, its specific effects still warrant examination, mostly regarding the effects on symptoms of anxiety disorders, other than panic.

Intolerance of Uncertainty

Intolerance of uncertainty is a relatively broad construct entailing cognitive, emotional and behavioural reactions to uncertainty in everyday situations (Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994). However, not everyone will experience anxiety when faced with uncertainty. The level of tolerance for uncertainty is likely to be a factor explaining those differences, and a factor which may increase the risk of anxiety disorders if intolerance is high (Carleton, Sharpe, & Asmundson, 2007). Intolerance of uncertainty was originally related to Generalized anxiety disorder. Dugas, Gagnon, Ladouceur, and Freeston (1998) suggested a model of GAD emphasizing the role of intolerance of uncertainty, cognitive avoidance, positive metacognitive beliefs about worry and negative problem orientation.

Intolerance of uncertainty was considered the main factor contributing to the frequency of "*What if...*" questions, which are anxiety-provoking. Indeed, studies show that intolerance of uncertainty was the most relevant factor in differentiating between people with GAD and controls (Dugas, Gosselin, & Ladouceur, 2011; Ladouceur, Gosselin, & Dugas, 2000; Thielsch, Andor, & Ehring, 2015; Van der Heiden et al., 2010). Differentiating between prospective and inhibitory intolerance of uncertainty offered interesting information about relations between intolerance of uncertainty and other anxiety disorders. In prospective intolerance, a person takes an active approach to uncertainty, seeking potential solutions in order to reduce the unpleasant feeling associated with uncertainty, while inhibitory intolerance of uncertainty leads to passivity and avoidant behavioural patterns (Carleton, Norton, & Asmundson, 2007). Prospective intolerance of uncertainty has been shown to mediate the relationship between neuroticism and generalized anxiety disorder, while inhibitory intolerance of uncertainty mediated the effects of neuroticism on panic and social anxiety (McEvoy & Mahoney, 2012). Therefore, the initial assumption that intolerance of uncertainty is a specific risk factor for generalized anxiety disorder seems to have been premature, since recent studies suggest that intolerance of uncertainty may be a non-specific trans-diagnostic factor in development and maintenance of different anxiety symptoms (Carleton, 2012).

Self-Esteem

The majority of research has focused on the predictive power of self-esteem in explaining depression symptoms, while less is known about its relationship with anxiety symptoms (Eisenbarth, 2012; Jelić, 2012; Lee, Dickson, Conley, & Holmbeck, 2014). There are studies suggesting weaker, but stable relationship between different anxiety symptoms, especially social anxiety, and measures of global self-esteem (Kocovski & Endler, 2000; Radovanović & Glavak, 2003; Sowislo & Orth, 2013). However, global self-esteem has not been shown as a specific correlate of social anxiety (Boelen & Reijntjes, 2009). Given the problems associated with global measures of self-esteem (Jelić, 2012; Tafarodi & Swann, 1995), it is reasonable to assume that predominant use of such global measures could have masked important effects. Measures focusing on different facets of self-esteem, such as self-liking and self-competence, have been shown to be useful in explaining the effects of self-esteem on different outcomes (Tafarodi & Swann, 1995). Self-liking reflects one's view of oneself as a good or bad person, or a desirable social object, while self-competence reflect one's view of oneself as having skills and abilities to attaint socially desirable goals. Given the fact that there are indications that individuals high on self-competence might, at the same time, be low on self-liking (Jelić, 2012), we considered it worthwhile to examine the possible differences in their effects.

The purpose of our study was threefold. First, to expand on the findings regarding direct and indirect effects of all five personality dimensions on different

anxiety symptoms, given the fact that openness to experience, conscientiousness and agreeableness have received less attention than neuroticism and extraversion. Second, to examine a specific effect of facets of anxiety sensitivity, intolerance of uncertainty and self-esteem in order to shed light on the question whether those effects are specific or trans-diagnostic. Third, to examine the possibility of anxiety sensitivity, intolerance of uncertainty and self-esteem mediating between personality dimensions and anxiety symptoms. Given the relative lack of research on specific effects of cognitive variables on different anxiety symptoms in Croatia, we hope to replicate existing findings and expand on our understanding of cognitive vulnerability to anxiety.

Method

Participants and Procedure

A total of 436 university students, aged 18 to 42 (M = 21.21, SD = 2.80) participated in the study. There were 208 male (47.7%) and 225 female (51.6%) students, with 3 participants who did not indicate gender (0.7%). The study was conducted during regular classes following approval of the institutional ethics committee and individual faculties' deans. Students, who were present during each class, participated in the study. All students present at the time gave their consent for participation, which resulted in a heterogeneous sample of students from different fields of study (medicine, natural sciences, agriculture, engineering, social studies and humanities). Participants were made aware of the voluntary, anonymous and confidential nature of the study, and that they were free to terminate their involvement at any time if they should choose to do so, without any explanation.

Measures

Personality. Personality dimensions were measured using *Big Five Inventory* (BFI; Benet-Martinez & John, 1998). A 44-item questionnaire measures neuroticism, openness to experience, conscientiousness, extraversion and agreeableness. Participants were expected to respond to what extent does certain item refer to them on a 5-point scale (ranging from 1 – *not at all* to 5 – *completely*). Composite scores are calculated as a mean value of responses on items in the individual subscale. Internal consistency coefficients were .83 for neuroticism, .80 for extraversion, .80 for conscientiousness, .78 for agreeableness and .73 for openness to experience.

Anxiety sensitivity. Anxiety sensitivity was measured using *Anxiety Sensitivity Index* (ASI; Reis, Peterson, Gursky, & McNally, 1986). ASI is a 16-item measure of a person's fear that he or she will experience anxiety symptoms, which will have negative physical, psychological and social consequences. Participants were expected to answer about the extent to which an item is true for them on a 5-point scale (ranging from 1 – *not true at all* to 5 – *completely true*). Composites are

calculated by adding the items on individual subscales (physical concerns, psychological concerns and social concerns) or the whole scale, with higher scores indicating higher anxiety sensitivity (Rodriguez, Bruce, Pagano, Spencer, & Keller, 2004). Internal consistency coefficients were .78 for psychological concerns, .86 for social concerns, .89 for physical concerns, and .90 for overall anxiety sensitivity.

Intolerance of uncertainty. Intolerance of uncertainty was measured using *Intolerance of Uncertainty Scale – Short form* (IUS-12; Carleton et al., 2007). IUS-12 is a short form (12 items) of the original *Intolerance of Uncertainty Scale* (Freestone et al., 1994). It is a highly reliable measure ($\alpha = .91$) with high correlation with the original scale ($r = .96$). Participants were expected to respond on a 5-point scale about the extent to which an item is true for them (ranging from 1 – *not true at all* to 5 – *completely true*). Composite scores for prospective and inhibitory intolerance of uncertainty are calculated by adding the items for each subscale, or for the whole scale, with higher scores indicating higher intolerance of uncertainty. Internal consistency coefficients were .80 for prospective, .82 for inhibitory intolerance of uncertainty, and .89 for overall intolerance of uncertainty.

Self-esteem. Self-esteem was measured using *Self Liking Self Competence Scale-Revised* (SLSC-R; Tafarodi & Swann, 2001). SLSC-R is a 16-item measure of both global self-esteem and two domains; self-liking (one's view of oneself as a good person and a desirable social object) and self-competence (one's view of oneself as having abilities one needs to attain socially desirable goals). Participants were expected to respond on a 5-point scale about the extent to which an item is true for them (ranging from 1 – *not true at all* to 5 – *completely true*). Composite scores for self-liking and self-competence are calculated by adding items corresponding to each subscale, or for the whole scale, with higher scores indicating higher self-esteem. Internal consistency coefficients were .87 for self-liking, .76 for self-competence, and .88 for overall self-esteem.

Panic. *Becks anxiety inventory* (BAI; Beck, Epstein, Brown, & Steer, 1988) was used as a measure of symptoms of panic. BAI is a widely used 21-item measure of physical and cognitive anxiety symptoms which closely overlap with symptoms of a panic attack. Although it is not a measure of panic per se, it is often used to measure symptoms of panic disorder, and some authors agree that it, in fact, measures panic rather than general anxiety symptoms (Cox, Cohen, Direnfeld, & Swinson, 1996). Participant are expected to respond on a 4-point scale about the extent to which each symptom bothered them during the past week (ranging from 0 – *not at all* to 3 – *severely, it bothered me a lot*). Composite is calculated by adding all 21 items with a higher score indicating higher anxiety. Internal consistency coefficient was .91.

Worry. *Penn State Worry Questionaire* (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) was used to measure worry as a central characteristic of generalized anxiety disorder. It is a 16-item measure of a person tendency for worry in everyday situations. Participants were expected to respond on a 5-point scale about the extent

to which an item is true for them (ranging from 1 – *not true at all* to 5 – *completely true*). Composite scores are calculated by adding all 16 items, with higher scores indicating more worry. Internal consistency coefficient was .91.

Social anxiety. *Brief Fear of Negative Evaluation Scale* (BFNE; Leary, 1983) was used as a measure of social anxiety. This is a 12-item measure of fear of being negatively evaluated in social situations. Participants were expected to respond on a 5-point scale about the extent to which an item is true for them (ranging from 0 – *not true at all* to 4 – *completely true*). Composite scores are calculated by adding all 12 items, with higher scores indicating more fear of negative evaluation. Internal consistency coefficient was .87.

Results

Descriptive data are presented in Table 1.

Table 1

Descriptive Data for Personality Dimensions, Anxiety Sensitivity, Intolerance of Uncertainty, Self-Esteem, and Anxiety Symptoms

	M	*SD*	*Theoretical range*	*Obtained range*	*Skewness*	*Kurtosis*
Neuroticism	2.72	0.69	1-5	1.13-4.75	0.16	-0.13
Openness to experience	3.49	0.60	1-5	1.89-4.80	0.07	-0.49
Conscientiousness	3.49	0.63	1-5	1.67-5.00	0.04	0.25
Extraversion	3.52	0.63	1-5	1.75-5.00	-0.18	-0.22
Agreeableness	3.52	0.57	1-5	1.78-4.89	-0.16	-0.17
Anxiety sensitivity	22.71	11.30	16-80	16-77	0.44	-0.41
Intolerance of uncertainty	33.83	9.11	12-60	13-59	0.03	-0.43
Self-liking	29.67	6.22	8-40	11-40	-0.41	-0.38
Self-competence	26.26	4.47	8-40	13-40	0.30	0.27
Panic	10.43	9.29	0-63	0-49	1.38	1.87
Worry	50.94	11.98	16-80	21-80	-0.06	-0.44
Social anxiety	21.59	9.08	0-48	0-47	0.18	-0.24

On average, descriptive data suggest that participants are not prone to panic, while mean values for worry and social anxiety are moderately high, which is expected in a non-clinical sample Also, they seem to be more bothered by intolerance of uncertainty and low self-esteem than anxiety sensitivity. However, comparison of theoretical and obtained range does suggest that there are a number of students at risk for anxiety disorders, as obtained ranges for worry and social anxiety are almost identical to theoretical ranger.

Table 2 shows correlation coefficients between variables. We also included gender to see if its effect needs to be controlled for in later analyses.

Table 2

Correlation Coefficients between Gender, Personality Dimensions, Anxiety Sensitivity, Intolerance of Uncertainty, Self-Esteem, and Anxiety

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Gender															
2. Neuroticism	.21**	-													
3. Openness to experiences	.05	-.16**	-												
4. Conscientiousness	.12*	-.21**	.15**	-											
5. Extraversion	.15**	-.27**	.23**	.45**	-										
6. Agreeableness	.09	-.34**	.27**	.19**	.16**	-									
7. Physical concerns	.22**	.33**	-.04	-.09	-.15**	-.12*	-								
8. Psychological concerns	.16**	.50**	.06	-.10*	-.15**	-.12*	.66**	-							
9. Social concerns	.18**	.40**	.05	-.05	-.04	-.03	.35**	.56**	-						
10. Prospective IUS	-.01	.39**	-.07	.09	-.15**	-.17**	.34**	.44**	.31**	-					
11. Inhibitory IUS	.07	.45**	-.12*	-.09	-.28**	-.12*	.45**	.51**	.34**	.72**	-				
12. Self-liking	-.04	-.41**	.17**	.25**	.41**	.09	-.25**	-.38**	-.28**	-.23**	-.40**	-			
13. Self-competence	-.07	-.39**	.34**	.56**	.44**	.15**	-.27**	-.29**	-.22**	-.22**	-.35**	.55**	-		
14. Panic	.17**	.38**	-.05	-.22**	-.12*	-.14**	.44**	.53**	.25**	.27**	.39**	-.32**	-.34**	-	
15. Worry	.22**	.67**	-.13**	.04	-.15**	-.11*	.41**	.52**	.37**	.51**	.54**	-.38**	-.28**	.42**	-
16. Social anxiety	.10*	.38**	-.20**	-.06	-.23**	-.02	.28**	.33**	.30**	.35**	.45**	-.48**	-.28**	.26**	.51**

Note. IUS = intolerance of uncertainty; $^{*}p < .05$; $^{**}p < .01$.

As can be seen in Table 2, neuroticism (positively) and extraversion (negatively) were significantly correlated with all three criteria (panic, worry and social anxiety), while correlations of other personality dimensions with criteria were not as consistent. Anxiety sensitivity, intolerance of uncertainty and self-esteem were all correlated with panic, worry and social anxiety with correlation coefficients ranging from .25 to .54. Gender was also significantly correlated with criteria, suggesting more panic, worry and social anxiety symptoms in female students.

In order to examine the effects of personality, anxiety sensitivity, intolerance of uncertainty and self-esteem on panic, worry and social anxiety symptoms, three hierarchical regression analyses (HRA) were performed. Due to significant correlations between predictors, we examined whether multicollinearity was an issue using variance inflation factors (VIFs). VIFs ranged from 1.20 to 1.89, which is sufficiently low to assume that it would not significantly affect coefficient estimates. Gender was added in the first step in order to control for its effects, personality dimensions, which correlated with each criterion, were added in the second step, and anxiety sensitivity, intolerance of uncertainty and self-esteem facets were added in the second step of each HRA. The results are presented in Table 3.

Table 3

Results of Hierarchical Regression Analyses for Panic, Worry and Social Anxiety

		Criterion		
Predictors		Panic	Worry	Social anxiety
Step 1		$\boldsymbol{R^2 = .03^{**}}$	$\boldsymbol{R^2 = .05^{***}}$	$\boldsymbol{R^2 = .01}$
		β	β	β
	Gender	$.19^{***}$	$.22^{**}$	.09
Step 2		$\boldsymbol{\Delta R^2 = .15^{***}}$	$\boldsymbol{\Delta R^2 = .43^{***}}$	$\boldsymbol{\Delta R^2 = .17^{***}}$
		β	β	β
	Gender	$.14^{**}$	.05	.04
Personality dimensions	Neuroticism	$.31^{***}$	$.70^{***}$	$.31^{***}$
	Openness to experiences	-	-.06	$-.10^{*}$
	Conscientiousness	$-.17^{**}$	-	-
	Extraversion	.01	.04	$-.15^{**}$
	Agreeableness	-.02	$.11^{**}$	-
Step 3		$\boldsymbol{\Delta R^2 = .19^{***}}$	$\boldsymbol{\Delta R^2 = .10^{***}}$	$\boldsymbol{\Delta R^2 = .16^{***}}$
		β	β	β
	Gender	$.10^{*}$	.06	.04
	Neuroticism	.04	$.52^{***}$	.08
	Openness to experiences	-	-.07	$-.11^{*}$
	Conscientiousness	$-.13^{*}$	-	-
	Extraversion	.09	$.09^{*}$	-.02
	Agreeableness	-.03	$.11^{**}$	-
Anxiety sensitivity	Physical concerns	.09	.09	.04
	Psychological concerns	$.38^{***}$	.05	-.06
	Social concerns	$-.10^{*}$	-.02	$.13^{*}$
Intolerance of uncertainty	Prospective	.00	$.18^{***}$	.09
	Inhibitory	.12	$.12^{*}$	$.17^{*}$
	Self-liking	-.05	$-.10^{*}$	$-.33^{***}$
	Self-competence	-.09	.06	.06
Total R^2		**.37**	**.57**	**.34**

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

As shown in Table 3, female gender predicted more symptoms of panic. After controlling for the effect of gender, only neuroticism (positively) and conscientiousness (negatively) predicted symptoms of panic. After controlling for gender and personality, psychological concerns (anxiety sensitivity) predicted more symptoms of panic. Social concerns (anxiety sensitivity), however, predicted fewer symptoms of panic. However, social concerns were positively correlated with panic, and further analysis revealed that their negative effect on panic was due to their correlation with psychological concerns, suggesting negative suppression effect (Paulhus, Robins, Trzesniewski, & Tracy, 2004). Furthermore, after entering variables in the third step of HRA, the effect of neuroticism was reduced to a non-significant level suggesting mediation.

Female gender also predicted more worry. After controlling for gender, neuroticism and agreeableness predicted more worry, and after controlling for effects of gender and personality, both prospective and inhibitory intolerance of uncertainty (positively) and self-liking (negatively) predicted worry. However, once variables in the third step were entered, the effects of neuroticism were reduced (but still significant), suggesting partial mediation. Also, the effect of extraversion was significant and positive in the third step, and further analyses, again, suggested negative suppression.

Finally, gender showed no significant effect on social anxiety, while neuroticism (positively), and both openness to experiences and extraversion (negatively) predicted social anxiety. After controlling for gender and personality, social concerns (anxiety sensitivity) and inhibitory intolerance of uncertainty predicted more symptoms, while self-liking predicted fewer symptoms. Furthermore, in the third step, neuroticism and extraversion were no longer significant predictors, suggesting mediated effects.

Given the fact that there were reductions in effects of neuroticism and extraversion in third steps of hierarchical regression analyses, in order to examine possible mediations we used Hayes's (2009) bootstrapping method for testing mediation. Hayes's method allows for testing multiple mediations instead of a number of single mediation in Baron and Kenny's (1986) procedure.

For panic, results have shown that the relationship between neuroticism and panic was mediated by psychological concerns (*indirect effect* = 3.1075; CI = 2.2775 to 4.1551). A small direct effect was also significant (*effect* = 1.9934; CI = .7017 to 3.2850), unlike the results of HRA which suggested full mediation.

The results of mediation analyses for worry and social anxiety, containing multiple mediations, are shown in Table 4.

Table 4

Summary of Results of Mediation Analyses for Worry and Social Anxiety

Worry						
Total effect of neuroticism on worry						
	Effect	*SE*	*t*	*p*	*Bootstrapping BCa*	
	11.6339	.6392	18.1997	.0000	10.3773	12.8905
Direct effect of neuroticism on worry						
	Effect	*SE*	*t*	*p*	*Bootstrapping BCa*	
	8.7334	.7033	12.4185	.0000	7.3509	10.1159
Indirect effect of neuroticism on worry						
			Effect	*SE*	*Bootstrapping BCa*	
Total			**2.9005**	**.4500**	**2.0757**	**3.8234**
Prospective intolerance of uncertainty			**1.2172**	**.4092**	**.4835**	**2.1189**
Inhibitory intolerance of uncertainty			**.5845**	**.2320**	**.1940**	**1.1076**
Self-liking			.3108	.2381	-.1320	.8120
Social anxiety						
Total effect of neuroticism on social anxiety						
	Effect	*SE*	*t*	*p*	*Bootstrapping BCa*	
	4.9026	.6034	8.1249	.0000	3.7164	6.0887
Direct effect of neuroticism on social anxiety						
	Effect	*SE*	*t*	*p*	*Bootstrapping BCa*	
	1.2529	.6500	1.9275	.0546	-.0249	2.5308
Indirect effect of neuroticism on social anxiety						
			Effect	*SE*	*Bootstrapping BCa*	
Total			**3.6496**	**.5061**	**2.7189**	**4.7080**
Social concerns			**.3787**	**.2132**	**.0147**	**.8653**
Inhibitory intolerance of uncertainty			**1.4395**	**.3277**	**.8446**	**2.1308**
Self-liking			**1.1918**	**.3138**	**.6607**	**1.9061**
Total effect of extraversion on social anxiety						
	Effect	*SE*	*t*	*p*	*Bootstrapping BCa*	
	-3.3569	.6855	-4.8969	.0000	-4.7044	-2.0093
Direct effect of extraversion on social anxiety						
	Effect	*SE*	*t*	*p*	*Bootstrapping BCa*	
	-.2572	.6593	-.3901	.6967	-1.5532	1.0389
Indirect effect of extraversion on social anxiety						
			Effect	*SE*	*Bootstrapping BCa*	
Total			**-3.0997**	**.4897**	**-4.1143**	**-2.1982**
Social concerns			**.2683**	**.1422**	**.0623**	**.6453**
Inhibitory intolerance of uncertainty			**-1.0626**	**.2768**	**-1.7158**	**-.6097**
Self-liking			**-1.5988**	**.3460**	**-2.3897**	**-.9976**

As can be seen in Table 4, both prospective and inhibitory intolerance of uncertainty were significant mediators between neuroticism and worry. Further comparison of their individual effects revealed no significant difference (*effect* = .6327; CI = -.4934 to 1.8104). Direct effect of neuroticism on worry was still significant which is in accordance with results of HRA.

Analyses for social anxiety showed that both neuroticism and extraversion effects were mediated by social concerns (anxiety sensitivity), inhibitory intolerance of uncertainty and self-liking. Both neuroticism and extraversion direct effects were not significant. However, further comparison of the individual indirect effects revealed some interesting differences. Neuroticism effects through inhibitory intolerance of uncertainty (*effect* = 1.0608; CI = .2376 to 1.8787) and self-liking (*effect* = .8131; CI = .1305 to 1.6327) were significantly stronger than the effect through social concerns, which suggest anxiety sensitivity to be the weakest mediator of the relationship between neuroticism and social anxiety. In comparison, extraversion effect through social concerns was significantly stronger than effects through inhibitory intolerance of uncertainty (*effect* = -1.3309; CI = -2.0006 to -.8377) and self-liking (*effect* = -1.8671; CI = -2.6659 to -1.2022), suggesting that anxiety sensitivity is the strongest mediator of the relationship between extraversion and social anxiety.

Discussion

The aim of our study was to examine effects of personality, anxiety sensitivity, intolerance of uncertainty and self-esteem on symptoms of panic, worry and social anxiety, and try to expand on the existing knowledge of their specific or trans-diagnostic relevance.

Results of the correlational analysis were in line with studies demonstrating the relevance of neuroticism (as a universal risk factor) and extraversion (as a universal protective factor) in explaining different psychopathological symptoms. Anxiety sensitivity, intolerance of uncertainty and self-esteem correlated with panic, worry and social anxiety. Although there were differences in the magnitude of correlation coefficients suggesting that anxiety sensitivity has stronger relations with panic and worry, intolerance of uncertainty with worry and self-esteem with social anxiety, we feel that those differences were not impressive enough to support the assumption of specific effects.

Results of hierarchical regression analyses, however, have shown some very interesting differences in their effects. Symptoms of panic were predicted by higher neuroticism and lower conscientiousness. However, even though Hayes's bootstrapping method suggested that there was still significant direct effect of neuroticism, the majority of its effect on the symptom of panic is due to the relation between neuroticism and psychological concerns (anxiety sensitivity). It is reasonable to assume that if one is prone to frequent unpleasant emotions, such as fear or sadness, one can develop a fear of possible implications or consequences of those feelings. Our results are in accordance with studies demonstrating the general impact of neuroticism on a broad spectrum of anxiety symptoms and a specific impact of anxiety sensitivity on symptoms of panic (Maller & Reiss, 1992; Schmidt

et al., 1997; Sexton, Norton, Walker, & Norton, 2003). Most studies examining the effect of anxiety sensitivity have focused on an overall measure of anxiety sensitivity. Studies examining the effects of individual facets of anxiety sensitivity on different psychopathological symptoms have mostly shown that physical concerns are most strongly related to panic (Deacon & Valentiner, 2001; Jurin & Biglbauer, 2018; Rector et al., 2007), psychological concerns with depression, GAD and PTSD (Lang, Kennedy, & Stein, 2002; Rector et al., 2007; Vujanovic, Zvolensky, & Bernstein, 2008), while social concerns are most strongly related to social anxiety (Naragon-Gainey, 2010; Rector et al., 2007; Zinbarg & Barlow, 1996). Our results suggest greater importance of a cognitive aspect of anxiety sensitivity, the fear that one is losing control over one's cognitive capacities, than fear of physical symptoms alone or social consequences of anxiety, which is somewhat surprising given the fact that catastrophic misinterpretations of physical symptoms play a major role in panic disorder. However, Deacon and Valentiner (2001) found that both physical concerns and psychological concerns were highest in participants who have had a panic attack in the last year. Given the fact that our sample consisted of students, all of whom were young and probably healthy, it is possible that their major concerns were consequences of anxiety in terms of damage to their cognitive functioning, which would jeopardize their academic functioning. Although the effect of conscientiousness on symptoms of panic could be mediated by other factors not examined in our study, our results suggest that its effect is small but direct. Conscientiousness has been associated with anxiety symptoms (Kotov et al., 2010). Poor ability for goal oriented behavior and poor impulse control could predispose an individual to making catastrophic conclusions about the meaning of symptoms of panic more easily, as well as avoidance, which is an important behavior characteristic of panic disorder.

The strongest predictor of worry was neuroticism, which affected worry both directly and indirectly through intolerance of uncertainty. Neuroticism can lead to selective attention on unclear and potentially harmful information, as well as overestimation of dangers and the likelihood of a negative outcome (Kotov et al., 2010; Lommen, Engelhard, & Van den Hout, 2010; Watson et al., 2005; Watson & Naragon-Gainey, 2014), and worry can be a person's attempt to mentally solve a situation, or relieve tension associated with it. Both prospective and inhibitory intolerance of uncertainty mediated the relationship between neuroticism and worry, which is in line with studies demonstrating that people high on neuroticism, also, show elevated levels of uncertainty related stress (Berenbaum, Bredemeier, & Thompson, 2010; Dugas & Koerner, 2005), as well as stronger emotional responses to uncertainty than to negative feedback (Hirsh & Inzlicht, 2008). Similar to how depressed people filter out information that is not congruent with their current emotional state, individuals high on neuroticism may be constantly "on the lookout" for possible dangers, while ignoring information to the contrary, which makes them less tolerant of uncertain outcomes. Unique effects of intolerance of uncertainty were documented in other studies (Carleton, 2012; McEvoy & Mahoney, 2012), and its

effect was shown to be stronger than effects of positive metacognitive beliefs about worry, negative problem orientation, cognitive avoidance (Buhr & Dugas, 2002) and anxiety sensitivity (Dugas et al., 2001). Low self-liking, also, predicted worry, which is in line with some studies examining the relations of general self-esteem and worry (Meyer et al., 1990). The effect of self-liking could be a result of a general underlying psychological distress, or low sense of control, which is common in people prone to worry (Clark & Wells, 1995).

Finally, fear of negative evaluation was predicted by neuroticism (positively), as well as openness to experiences and extraversion (negatively). Furthermore, neuroticism and extraversion effects were mediated by social concerns (anxiety sensitivity), inhibitory intolerance of uncertainty and self-liking, while openness to experiences had a direct effect. Results are, again, in line with studies demonstrating neuroticism as a universal risk factor, and extraversion as s protective factor against anxiety. However, they also support the advantage of examining specific rather than general traits in explaining specific anxiety symptoms. Neuroticism can lead to concerns about the implications of one's anxiety or if others see it, and fears that others will devalue a person because of it. Taking into account clinical presentations of social anxiety disorder, which include low self-esteem, fear that other will evaluate a person negatively, and avoidance of many social situations, it is not surprising that social concerns, inhibitory intolerance of uncertainty and self-liking predicted social anxiety. Concerns about social consequences of anxiety can contribute to one's fears of exhibiting anxiety in public and the conviction that it will lead to negative evaluation or social rejection (Deacon & Abramowitz, 2006). There has been some support for the relationship between intolerance uncertainty and social anxiety (Boelen & Reijntjes, 2009; Carleton, Collimore, & Asmundson, 2010; Teale Sapach, Carleton, Mulvogue, Weeks, & Heimberg, 2014). Social situations are, by nature, unclear due to verbal and nonverbal signs often being ambiguous. To a person with low tolerance of uncertainty, it may be very difficult to enter situations in which they are not certain of the outcome, so they might conclude that they should avoid it. Low self-liking, also, predicted social anxiety, which is in line with studies examining the relationship between self-esteem and social anxiety (Kocovski & Endler, 2000; Radovanović & Glavak, 2003). Some authors believe that social fears originate primarily from a person's view of oneself as not good enough and that people with social anxiety fear that, due to their perceived shortcomings, they will not be able to meet the demands of social situations (Jelić, 2012; Moscovitch, 2008). The fact that self-competence was not predictive of social anxiety suggests that one's perception of one's worth is crucial for protecting against social anxiety rather than one's perception of one's abilities.

Extraversion effect was, also, mediated by social concerns, inhibitory intolerance of uncertainty and self-liking. Extraverts are sociable, dominant, assertive, confident in seeking social interactions, therefore it is expected they would not be burdened with social concerns, outcomes of social situations nor fears of

negative evaluation. However, people who are lacking in these qualities might also have low opinion of themselves, worry about outcomes, social implications of their anxiety, as well fear negative evaluation (Naragon-Gainey, Watson, & Markon, 2009). The fact that extraversion only predicted social anxiety, while it had no significant effects on panic or worry, and that social concerns were the strongest mediator between extraversion and social anxiety supports the interpersonal importance of extraversion. As far as the negative effect of openness to experiences is concerned, it is in line with the results of a few studies (Kaplan et al., 2015; Watson & Naragon-Gainey, 2014). People low on openness are less interested in new experiences, including social ones, and the negative relation with social anxiety is not surprising given the tendency to avoid social situations, especially new and unfamiliar ones, in people with social anxiety.

In conclusion, when examining the effects of personality, our results support the assumption of neuroticism being a universal risk factor across all anxiety symptoms, although it had the strongest effect on worry. This is in line with a few other studies suggesting that the relation between neuroticism and worry reflects the fact that worry is saturated with general psychological distress and anxious feeling, which are not focused on a particular object of fear, but rather on a broad spectrum of everyday situations (Watson et al., 2005; Watson & Naragon-Gainey, 2014). Results did not support the assumption of extraversion being a universal protective factor, however. They suggest that the protective role of extraversion, when it comes to anxiety, is mostly related to its interpersonal dimension. Although conscientiousness and openness to experiences showed effects on panic and social anxiety, our results do not offer sufficient information to draw a conclusion about their universal or specific effects. Results regarding anxiety sensitivity and intolerance of uncertainty offer more support to the specificity of effects, with psychological concerns (anxiety sensitivity) having the largest effects on panic, and intolerance of uncertainty is having the largest cumulative effect on worry. Furthermore, self-liking had the largest effect on social anxiety, while interpersonal and inhibitory aspects of anxiety sensitivity and intolerance of uncertainty, also had significant effect. Clearly, in understanding cognitive vulnerabilities research should focus on individual facets of anxiety sensitivity, intolerance of uncertainty and self-esteem. Mediational analyses also support the assumption that neuroticism, as a largely genetically determined disposition common to all anxiety disorders, can make a person vulnerable to the development of certain traits and cognitive styles that increase the risk of the development of specific anxiety disorders.

Implications and Future Directions

Results of our study have some important practical implications. Interventions aimed at anxiety sensitivity and intolerance of uncertainty have been shown useful in treating anxiety symptoms (Carleton, 2012; Smits, Berry, Tart, & Powers, 2008). However, our results suggest that focusing on specific aspects of anxiety sensitivity

and intolerance of uncertainty could prove to be beneficial in tailoring interventions to a specific need of an individual, which may be overlooked in interventions aimed generally at anxiety sensitivity or intolerance of uncertainty. For example, a person whose anxiety sensitivity is concentrated around psychological concerns may not benefit as much from attempts to decatastrophizing the meaning of anxiety or panic symptoms. Likewise, it seems useful to assess whether someone's intolerance of uncertainty is mostly passive or active in order to use appropriate intervention. Passive or inhibitory intolerance could benefit more from interventions aimed at meaning and implications of uncertainty, while active or prospective intolerance might benefit more from targeting a sense of control, skills training or metacognitive beliefs about worry.

Neuroticism, clearly, has an effect on different anxiety symptoms, as well as anxiety sensitivity, intolerance of uncertainty and self-esteem. However, it is still unclear what determines whether a person high on neuroticism will develop anxiety sensitivity, intolerance of uncertainty and/or low self-esteem. Future research should focus on paths or conditions under which certain traits facilitate the development of cognitive vulnerabilities to specific anxiety symptoms. Focusing on facets of personality dimensions might increase our understanding of the links between personality, anxiety sensitivity, intolerance of uncertainty and self-esteem.

Finally, some limitation of our study need to be mentioned. The sample consisted of university students, which limits the generalization to both clinical and general population, given the fact that studies suggest that students experience more psychopathological symptoms than their same-aged peers (Blanco, Okuda, & Wright, 2008; Hunt & Eisenberg, 2010). Self-report measures were used, which also limits conclusions regarding clinical levels of symptoms, as well as raise concerns about the appropriateness of measures for symptoms of anxiety disorders. While authors agree that BAI mostly measures panic symptoms, it does not cover diagnostic criteria of panic disorder. Furthermore, while fear of negative evaluation is central to social anxiety disorder, some authors agree that it is but one aspect of social anxiety, which limits our conclusions about the relations of examined variables with the entire spectrum of social anxiety symptoms (Teale Sapach et al., 2014). Similarly, while worry is a dominant feature of generalized anxiety disorder, PSWQ does not asses the severity of GAD symptoms. Finally, correlational nature of the design limits conclusions about causality and whether changes in anxiety sensitivity, intolerance of uncertainty and self-esteem temporally precede changes in symptoms.

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Kognitivna osjetljivost na anksioznost: Most između ličnosti i simptoma

Sažetak

Cilj je ovoga rada bio ispitati učinke ličnosti, anksiozne osjetljivosti, netolerancije neizvjesnosti i samopoštovanja na različite simptome anksioznosti. Uzorak je činilo 436 studenata, koji su ispunili mjere ličnosti, anksiozne osjetljivosti, netolerancije neizvjesnosti, samopoštovanja te simptoma panike, brige i socijalne anksioznosti. Rezultati su pokazali da neuroticizam, savjesnost i zabrinutost za mentalnu nedostatnost (anksiozna osjetljivost) predviđaju simptome panike, te da zabrinutost za mentalnu nedostatnost posreduje u odnosu između neuroticizma i panike. Brigu su predviđali neuroticizam, prospektivna i inhibitorna netolerancija neizvjesnosti te samosviđanje, s tim da je netolerancija neizvjesnosti posredovala između neuroticizma i brige. Konačno, neuroticizam, otvorenost za iskustva i ekstraverzija, kao i socijalna zabrinutost (anksiozna osjetljivost), inhibitorna netolerancija neizvjesnosti i samosviđanje predviđali su socijalnu anksioznost. Socijalna zabrinutost, inhibitorna netolerancija neizvjesnosti i samosviđanje posredovali su u odnosu neuroticizma i ekstroverzije sa simptomima socijalne anksioznosti. Naši rezultati podržavaju pretpostavku o tome da je neuroticizam opći rizični čimbenik, te da anksiozna osjetljivost, netolerancija neizvjesnosti i samopoštovanje mogu imati specifične učinke na simptome anksioznosti.

Ključne riječi: ličnost, anksiozna osjetljivost, netolerancija neizvjesnosti, samopoštovanje, simptomi anksioznosti

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